Multi-level sampling approach for continous loss detection using iterative window and statistical model

Abstract

This paper proposes a Multi-Level Sampling (MLS) approach for continuous Loss of Self-Similarity (LoSS) detection using iterative window. The method defines LoSS based on Second Order Self-Similarity (SOSS) statistical model. The Optimization Method (OM) is used to estimate self-similarity parameter since it is fast and more accurate in comparison with other estimation methods known in the literature. Probability of LoSS detection is introduced to measure continuous LoSS detection performance. The proposed method has been tested with real Internet traffic simulation dataset. The results demonstrate that normal traces have probability of LoSS detection below the threshold at all sampling levels. Meanwhile, false positive detection can occur where abnormal traces have probability of LoSS that imitates normal behavior at sampling levels below 100 ms. However, the LoSS probability exceeds the threshold at sampling levels larger than 100 ms. Our results show the possibility of detecting anomaly traffic behavior based on obtaining continuous LoSS detection monitoring.